#### **Job Title**

Research scientist position for a statistician in climate science – R2/R3

#### **About the host institute - BSC**

BSC-CNS (Barcelona Supercomputing Center – Centro Nacional de Supercomputación) combines unique high performance computing facilities and in-house research departments on computer, life, and Earth sciences, and computational applications, counting more than 400 researchers and students from more than 40 different countries. BSC-CNS has been accredited as one of the first eight Severo Ochoa Centers of Excellence. This award is given by the Spanish Government as recognition for leading research centers in Spain that are internationally well known institutions in their respective areas. BSC-CNS is the National Supercomputing Facility in Spain and manages MareNostrum, one of the most powerful supercomputers in Europe. The mission of BSC-CNS is to investigate, develop and manage information technology in order to facilitate scientific progress. To get an idea of what it is like to work at the BSC take a look at this video:<https://www.youtube.com/watch?v=VRkEii7OzRE>

#### **Context**

Within the Earth Sciences Department of Barcelona Supercomputing Center (BSC-ES), led by Prof Francisco Doblas-Reyes, the climate prediction group, led Dr. Pablo Ortega and Dr. Louis-Philippe Caron, aims at developing climate prediction capability for time scales ranging from a few weeks to a few decades (sub-seasonal to decadal climate prediction) and from regional to global scales. This objective relies on a deep analysis of the strengths and weaknesses of state-of-the-art climate forecast systems, via a thorough comparison with the most up-to-date observational datasets, and on exploiting these detailed analyses to refine the representation of processes relevant to climate in our forecast systems and their initialization. Our activities focus both on understanding climate variability and the sources of predictability and improving forecast quality.

Positioned at the cutting-edge of climate prediction research, the climate prediction group is composed of nearly 20 scientists, most of which are early-career scientists, and combines a large variety of expertise on climate processes from the stratosphere down to the deep ocean and from tropical to polar latitudes, together with expertise in climate modelling and data assimilation.

The group can rely on a team of more than 15 engineers and technicians to support the computer infrastructure in place, improve the computational performance of the climate model and develop new tools required by the scientific team. It also collaborates closely with the services group within the department providing top-notch climate information to large variety of stakeholders. Finally, the group is part of the development team and a key user of the EC-Earth European global climate model ([http://www.ec-earth.org](http://www.ec-earth.org/)) and as such collaborates closely with all the members of the EC-Earth consortium.

Particular attention is paid to the career path of the scientists, who are given gradually increasing responsibilities within the group and in the context of both national and international projects. Outstanding opportunities exist for establishing links with other international climate research institutions and, if interested, to participate in the tutoring and monitoring of early-career scientists.

#### **Key duties**

This position requires participation in two projects funded by the European commission as part of the H2020 programme:

1. **EUCP**, which will develop an innovative European regional ensemble climate prediction system based on a new generation of improved and typically higher-resolution climate models, covering timescales from seasons to decades initialized with observations, and designed to support practical and strategic climate adaptation and mitigation decision-taking on local, national and global scales.
2. **MEDSCOPE**, which aims to improve climate forecast capabilities and related climate services on seasonal-to-decadal timescales over the Mediterranean region.

The tasks of the selected applicant will be:

* Implement and develop bias correction and forecast calibration methods for seasonal and decadal forecasts which account for spatial shifts in patterns of variability and sensitivity of bias to climate conditions
* Develop both deterministic and probabilistic multivariable user-driven forecast scores to allow for efficient and targeted forecast system comparison and evaluation
* Estimate the added value of combining climate predictions compared to non-initialized forced-only simulations
* Combine multiple forecast systems using methodologies based on past performance to provide a single source of information in probabilistic form, particularly for extreme events
* Explore the relative merits of different calibration approaches and evaluate the advantages of single-model calibration versus the multi-model in terms of forecast quality
* Improve the decadal climate predictions over land areas, with a focus on the Euro-Mediterranean region, using information from the observed teleconnections of the main modes of ocean variability or from the middle troposphere
* Test methods traditionally used in climate projections to i) quantify uncertainty and to ii) combine different members to assess and improve the forecast quality of climate predictions
* Develop procedures for observational uncertainty propagation in model assessment at different time and spatial scale and evaluate how the propagation of observational uncertainty compares with the use of alternate references
* Develop methodologies to combine ensemble climate predictions with climate projections to build skillful climate storylines for the next 30 years
* Assess the observational error correlation scale for different climate variables
* Improve the representation of observational uncertainty in the computation of verification metrics

The candidate will work closely with scientist within the Earth System Service group of the Earth Science Department and potentially stakeholders in order to develop user-relevant and actionable climate information**.** The Earth System Services group focus is on the impact of weather and climate upon socio-economic sectors such as renewable energy, agriculture and insurance and strives to improve the societal value of climate services.

**Requirements**

Education

* PhD in physics, applied mathematics, engineering, atmospheric science or in a related discipline

Essential Knowledge and Professional Experience

* Proven ability to prepare and submit manuscripts to peer-review journals
* Experience in ocean/atmosphere modelling (or environmental modelling) and in handling climate model output
* Programming skills: scripting (e.g. bash, python), data analysis and visualization software (e.g. CDO, NCO, R, Python, NCL)
* Experience in handling large datasets
* Strong statistical and/or machine-learning background

Additional Knowledge

* Interest and capacity in participating in the writing in and, when possible, leading the preparation of research
* Knowledge of version control systems (git, svn, cvs…)
* Familiarity with uncertainty
* Interest in tutoring and/or advising master and PhD students

Competences

* Fluency in spoken and written English, while fluency in other European languages will be also valued
* Highly collaborative spirit and ability to work as part of a large, strongly-coordinated team and to continuously share both knowledge and tools
* Ability to efficiently communicate results

#### **Conditions**

* The contract will be for two years initially, with the possibility of renewal depending on performance
* A competitive salary will be offered, matched to the cost of living in Barcelona, and commensurate with the value and experience of the candidate
* The applicant will work at the BSC (Barcelona, Spain) within the Earth Sciences Department.
* The position will start as soon as possible.

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#### **Application procedure**

All applications must be uploaded before November 12th (2017) to XXXX, including:

1. A motivation letter.
2. A full CV including contact details.
3. Two reference contacts.